

REMARKS

Summary of the Office Action

Receipt is acknowledged of the Office Action of March 3, 2006. Claims 1-13 are currently pending in the application, Claim 14 having been cancelled by the present Amendment. Claims 1-14 were subject to a restriction requirement. Claims 1, 4-10 and 12 were provisionally rejected on the ground of non-statutory obviousness-type double patenting. Claims 1-13 were rejected in the Office Action under 35 U.S.C. §112, second paragraph, for failure to particularly point out and distinctly claim subject matter which applicant regards as his invention. Claims 1, 3-10 and 12 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,172,847 (hereinafter "Sakatani") in view of U.S. Patent No. 6,395,677 (hereinafter "Hokkirigawa '677"). Claim 2 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Sakatani and Hokkirigawa '677 and further in view of U.S. Patent No. 5,697,709 (hereinafter "Mori"). Claim 11 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Sakatani and Hokkirigawa '677 and further in view of U.S. Patent No. 4,737,539 (hereinafter "Jinno"). Claim 13 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Sakatani and Hokkirigawa '677 and further in view of U.S. Patent Publication No. US 2002/0114548 (hereinafter "Hokkirigawa '548"). Applicants respectfully disagree with the Examiner with respect to the rejected Claims and request reconsideration of the rejection, as explained in more detail below.

Response to Restriction Requirement

Applicants affirm election of Claims 1-13. Claim 14 has been cancelled as non-elected.

Response to Double Patenting Rejection

In response to the provisional obviousness-type double patenting rejection, Applicants are filing concurrently with this Response a Terminal Disclaimer.

Response to Claim Rejections Under 35 U.S.C. §112

Claim 1 and its dependent claims were rejected as indefinite because the limitation "RBC or CRBC" of Claim 1 was unclear as to which composition was claimed. Applicants amended Claim 1 to recite more particularly recite the limitation as follows: "... powder of one of RBC or CRBC..." A similar amendment was made to Claim 13.

Claim 12 was rejected as indefinite because it was unclear what is a "rust-resistant steel series metal." In accordance with the Examiner's suggestion, Applicants amended Claim 12 to recite "rust resistant steel."

Applicants believe that all claims remaining in the Application comply with the definiteness requirement of 35 U.S.C. §112.

Response to Claim Rejections Under 35 U.S.C. §103(a)

Claims 1, 3-10 and 12 were rejected by the Examiner under 35 U.S.C. §103(a) as allegedly being unpatentable over Sakatani in view of Hokkirigawa '677. Applicants amended independent Claim 1 to more particularly claim the invention disclosed in the present Application.

As claimed in current independent Claim 1, the present invention is an unshielded sleeve bearing for use in water. The sleeve bearing includes a shaft and a sleeve. At least a portion of the sleeve or the shaft is made of a corrosion-resistant and low-friction synthetic resin composition obtained by uniformly blending a powder of one of RBC or CRBC material with fibers and a resin. The shaft and unshielded sleeve of the bearing are submersed in water.

As described in the specification of Hokkirigawa '677, this reference teaches the process of obtaining porous RBC and CRBC materials. Specifically, Hokkirigawa '677 teaches:

a porous material suitable for use in a bearing retainer, obtained by a process comprising the steps of mixing degreased bran derived from rice bran with a thermosetting resin before kneading, subjecting a kneaded mixture to a primary firing in an inert gas at a temperature in a range of 700 to 1000 °C, pulverizing the kneaded mixture obtained after the primary firing into carbonized powders sieved through a 60-mesh screen, mixing the carbonized powders with the thermosetting resin before kneading, pressure-forming a kneaded mixture thus obtained at a pressure in a range of 20 to 30 MPa, and applying a heat treatment again to a formed kneaded mixture in the inert gas at a temperature in a range of 100 to 1100 °C

Col. 3, lines 18-29

The steps described in Hokkirigawa result in producing the RBC/CRBC material.

The same process of obtaining RBC/CRBC material is described in the "Background of the Invention" section of the present Application. However, Hokkirigawa fails to disclose additional steps required to produce the composition used in the presently claimed invention. Specifically, as claimed in the amended Claim 1 of the present Application, the composition from which a portion of the shaft or the sleeve is formed is obtained by uniformly blending a powder of RBC/CRBC material, i.e., the "porous material" disclosed in Hokkirigawa, with fibers and a resin. These additional processing steps produce the "corrosion-resistant and low-friction" synthetic resin, which is required by the present invention.

As further explained in Hokkirigawa '677, "porous material" obtained in accordance with the method may then be "pressure-formed into the shape of a retainer." *See Col. 4, lines 33-34.* The bearing retainer is then used in a ball bearing to retain balls packed in oil and grease to ensure proper rotation of the balls along the races formed on the outer and inner rings of the ball bearing. Ball bearing having an RBC/CRBC retainer packed with lubricating oil is

unsuitable for use in underwater applications because water washes away lubricating oil from the retainer thus destroying lubrication and the bearing itself. In order for a conventional ball bearing with a retainer to be used in an underwater application, the bearing has to be shielded from the surrounding water. This is an expensive and labor intensive process.

In accordance with the Applicant's invention, the sleeve bearing used in underwater applications is unshielded. Therefore, no lubricating oil can be provided in such unshielded construction. Further, since there is no lubricating oil or grease, the bearing sleeve or the shaft has to be made of a material having low surface friction. As explained above, this material is obtained by uniformly blending a powder of RBC/CRBC material, i.e., the "porous material" disclosed in Hokkirigawa, with fibers and a resin. Thus, Hokkirigawa fails to disclose the low-friction synthetic resin and the unshielded bearing construction required by the present invention.

Sakatani discloses a hydrodynamic bearing assembly having a sleeve 6, shaft 1 and a plurality of hydrodynamic pressure generating grooves 41, 44 formed on the surface of the shaft. In order for the disclosed hydrodynamic bearing to function properly, the bearing gap between the sleeve 6 and the shaft 1 has to be filled with lubricating oil of a particular viscosity. *See Col. 6, lines 18-22.* During operation of the bearing assembly taught by Sakatani, grooves 41, 44 generate dynamic pressure gradients in the lubricating oil. In order for the hydrodynamic bearing assembly of Sakatani to be used in underwater applications, the assembly has to be shielded from the surrounding water. Therefore, Sakatani fails to disclose the unshielded bearing construction required by the amended Claim 1.

Based on the above, Applicants believe that limitations of independent Claim 1, reciting the "unshielded sleeve bearing for use in water" having "at least a portion of the sleeve

or the shaft ... made of a corrosion-resistant and low-friction synthetic resin composition obtained by uniformly blending a powder of one of RBC or CRBC with fibers and a resin" where the shaft and the sleeve "are submersed in water" are not met by the prior art of record.

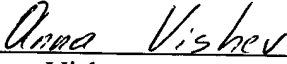
Therefore, Claim 1 is believed to be patentable over the prior art of record.

Dependent Claims 2-13, are rejected over the same Sakatani and Hokkirigawa references. Applicants respectfully submit that dependent Claims 2-13 are believed to define patentable subject matter in view of their dependency upon allowable Claim 1 and, further, on their own merits.

The Examiner is urged to telephone Applicant's undersigned counsel at the number noted below if it will advance the prosecution of this application, or with any suggestion to resolve any condition that would impede allowance. In the event that any extension of time is required, Applicant petitions for that extension of time required to make this response timely. Kindly charge any additional fee, or credit any surplus, to Deposit Account No. 50-0675, Order No. 051319-166.

Respectfully submitted,

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